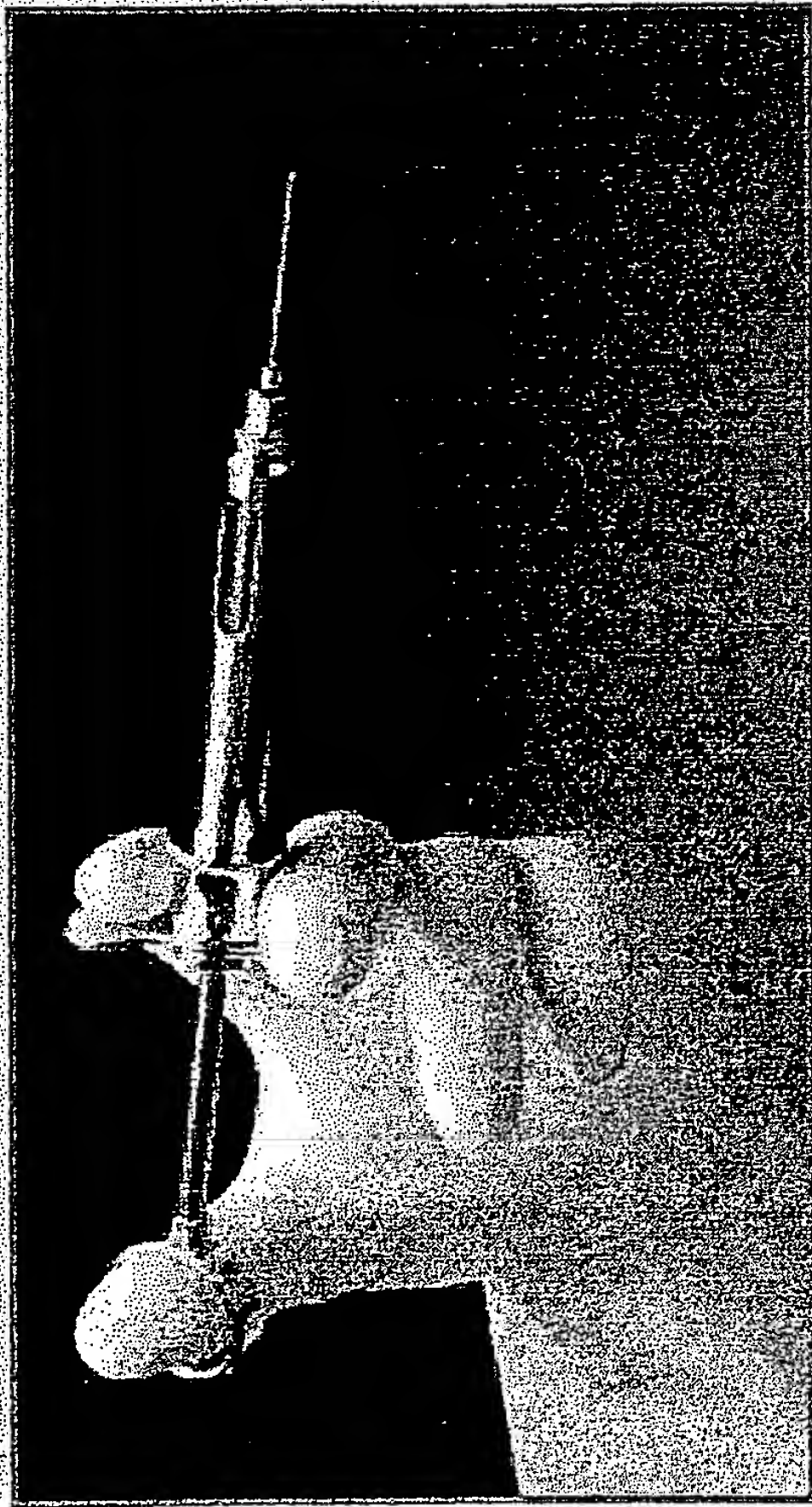


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## Palm-Thumb Grasp



## Pen Grasp

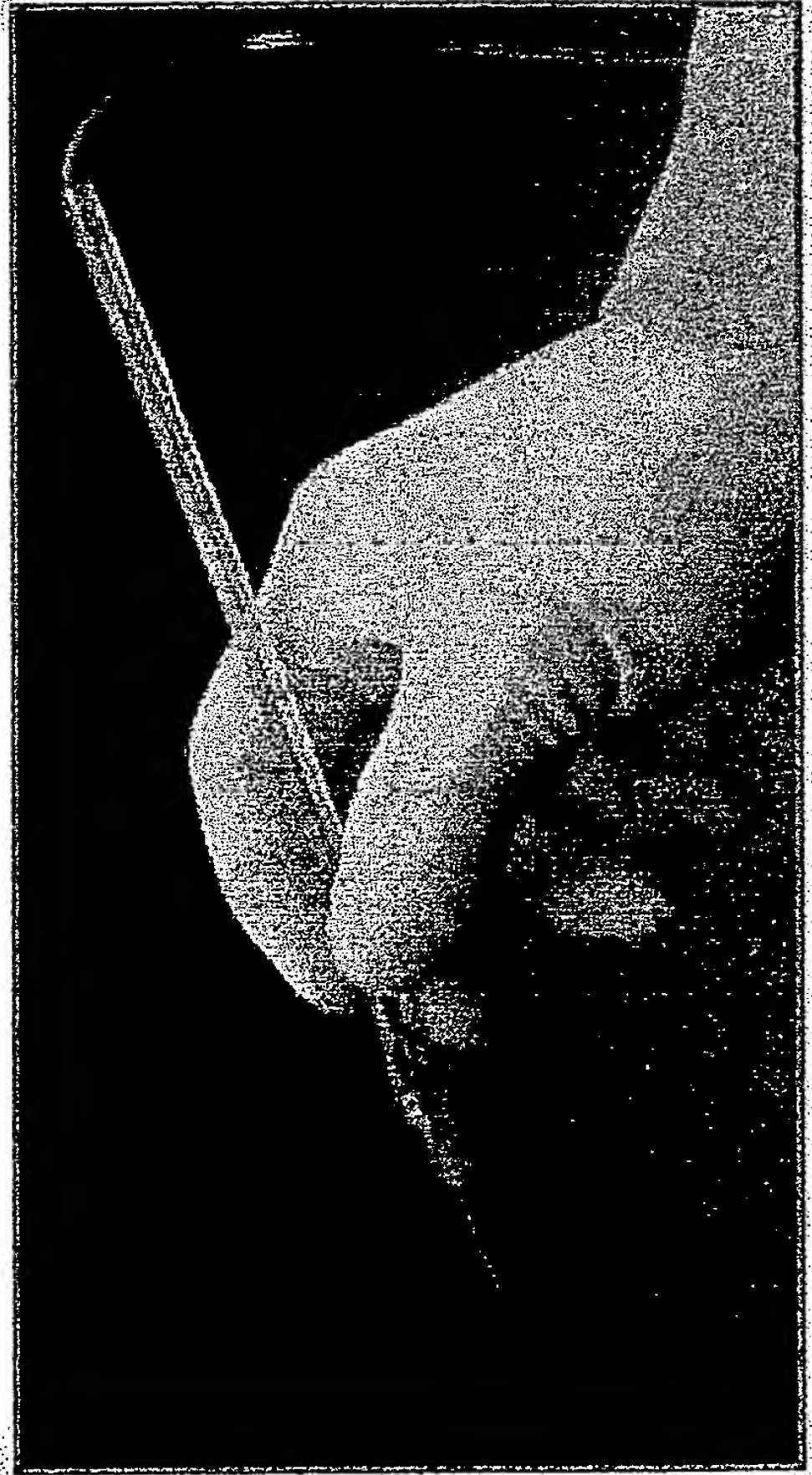


FIG. 1A

PALM THUMB

FIG. 1B

PEN

Figure 3

THUMB

# Insertion Techniques

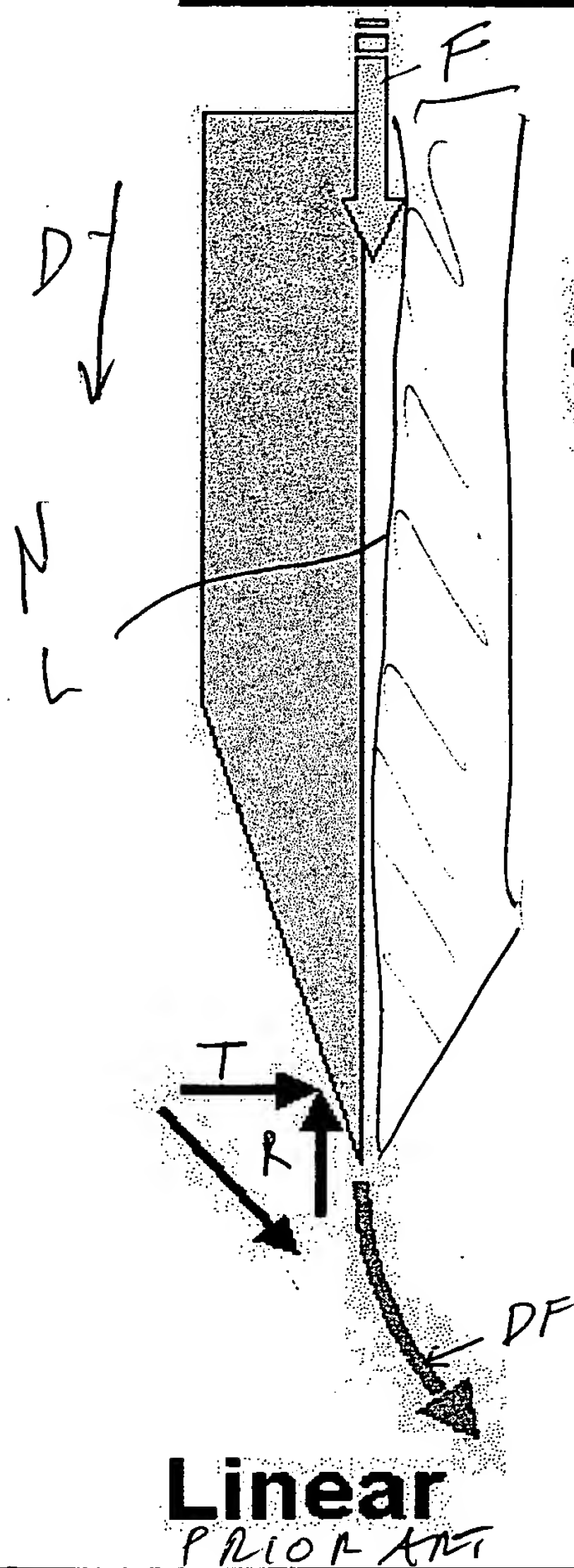


FIG. 2A

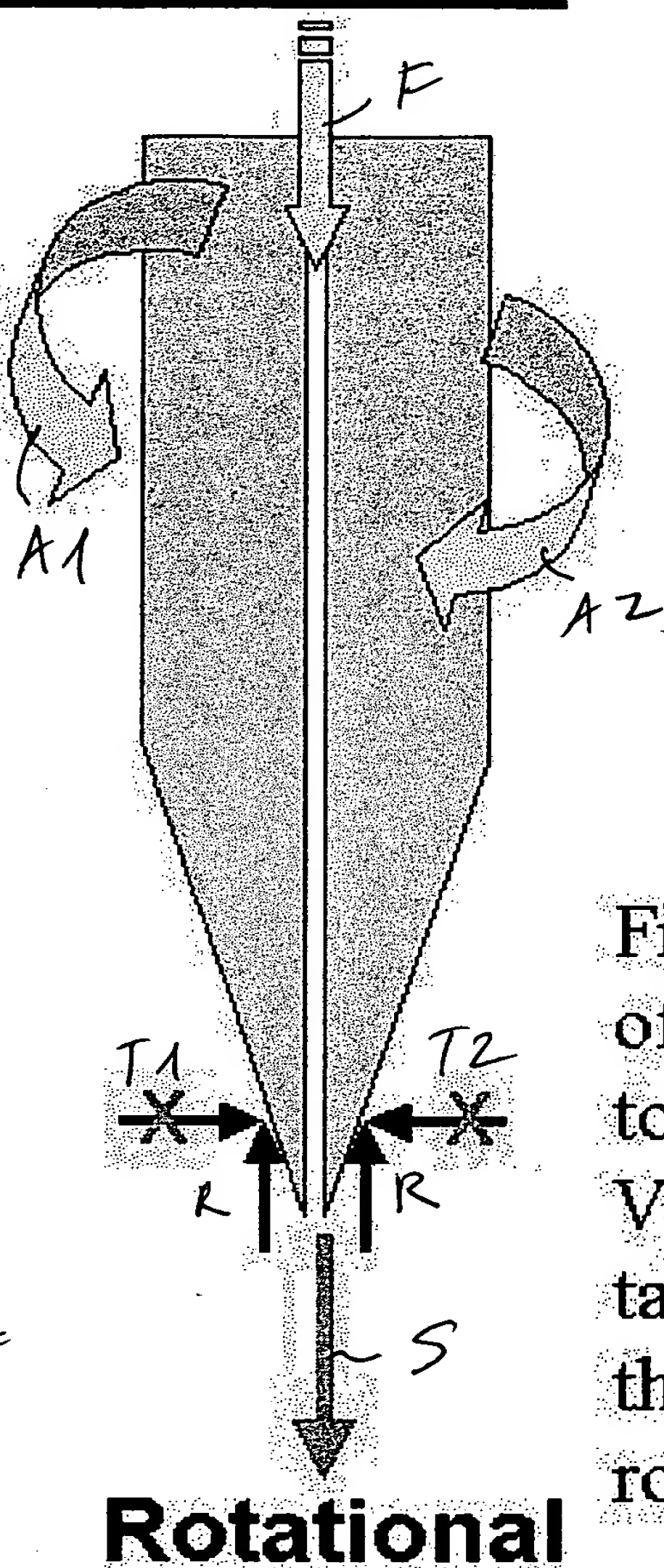


FIG. 2B

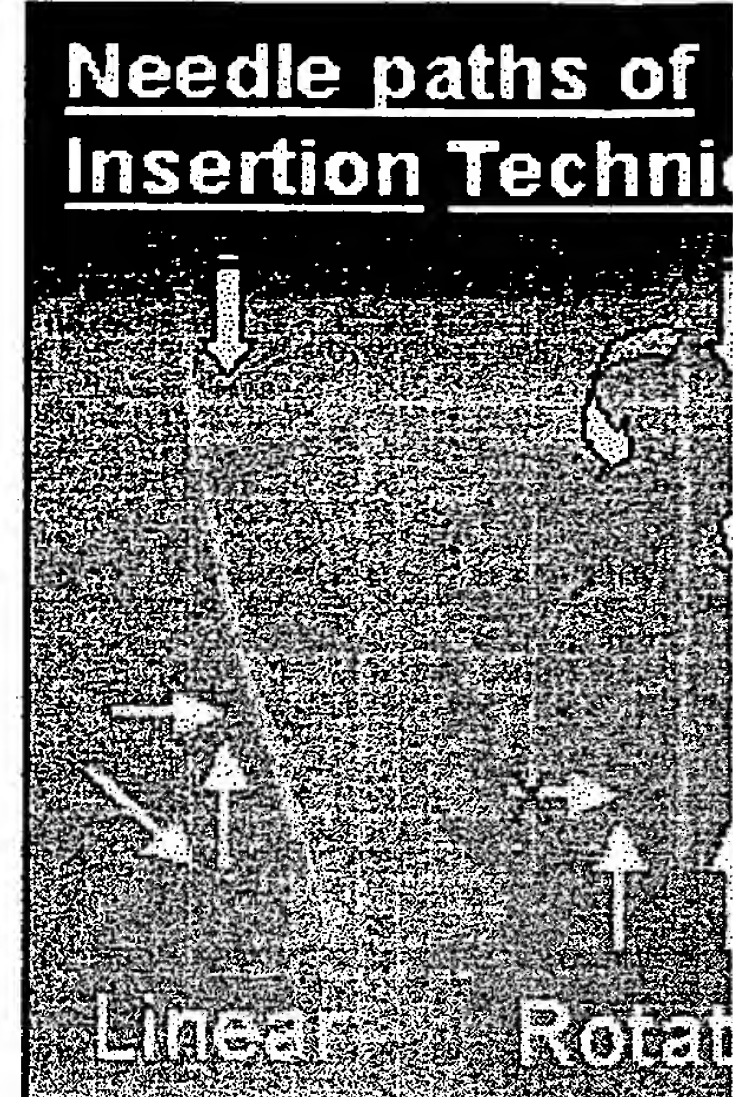


Figure 4 simplistic illustration of the vector force system to the beveled end of the needle. Vector analysis illustrates the forces taken during needle insertion in the Linear and the Bi-rotational insertion techniques.

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# Rotational Insertion

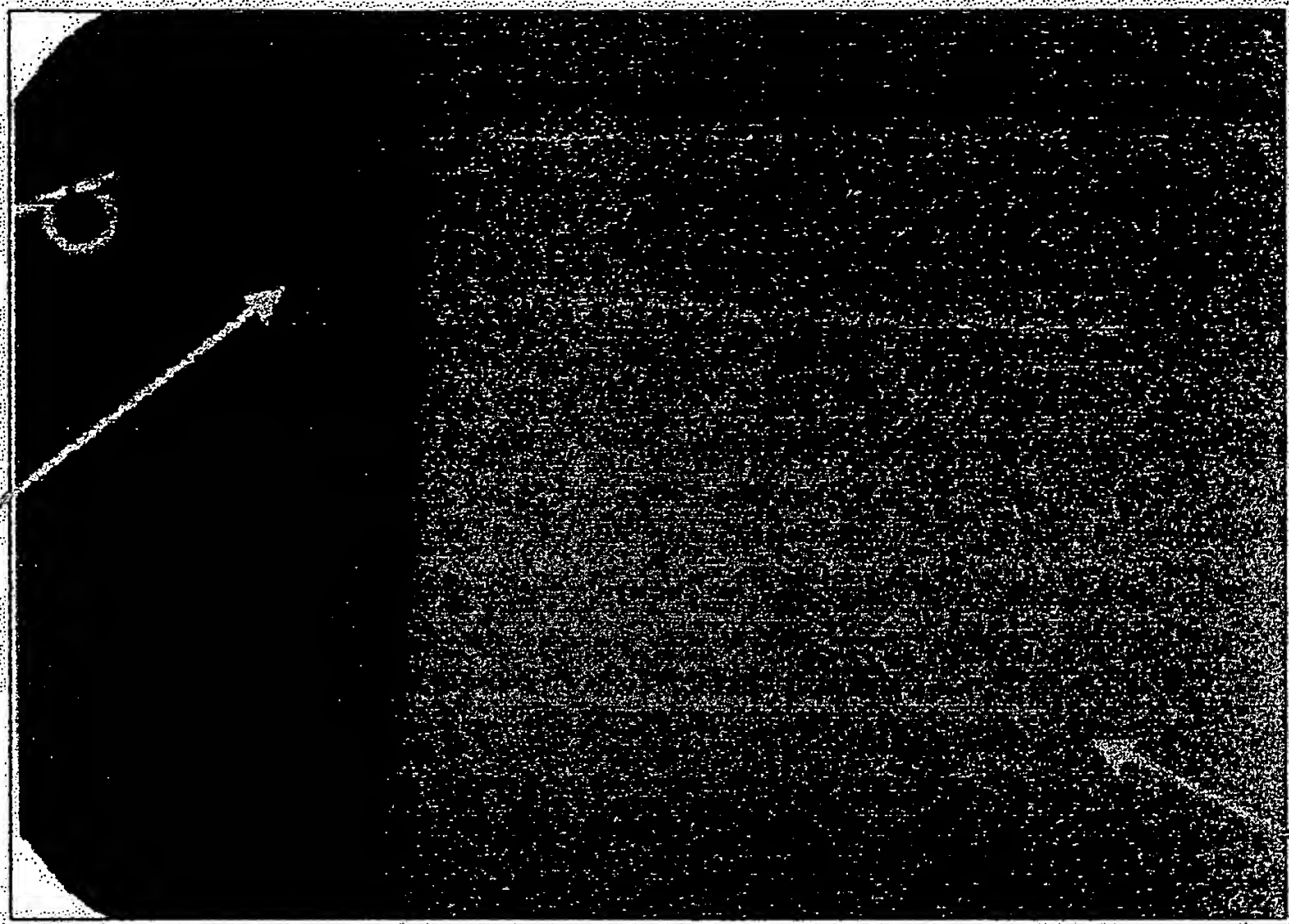


FIG. 3B  
30-gauge needle

# Linear Insertion

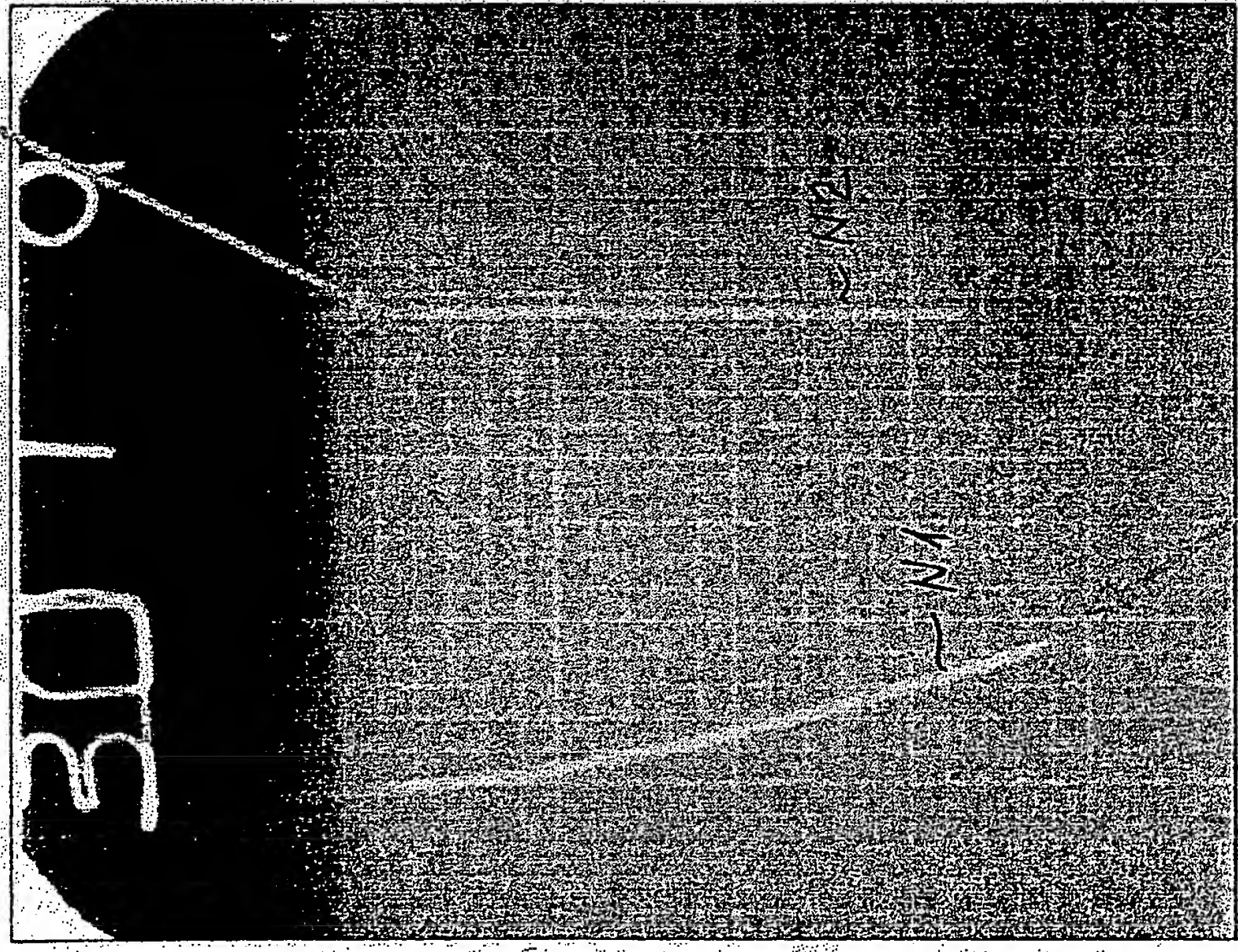


FIG. 3A  
Linear Insertion

# Linear vs. Bi-directional rotation Insertion

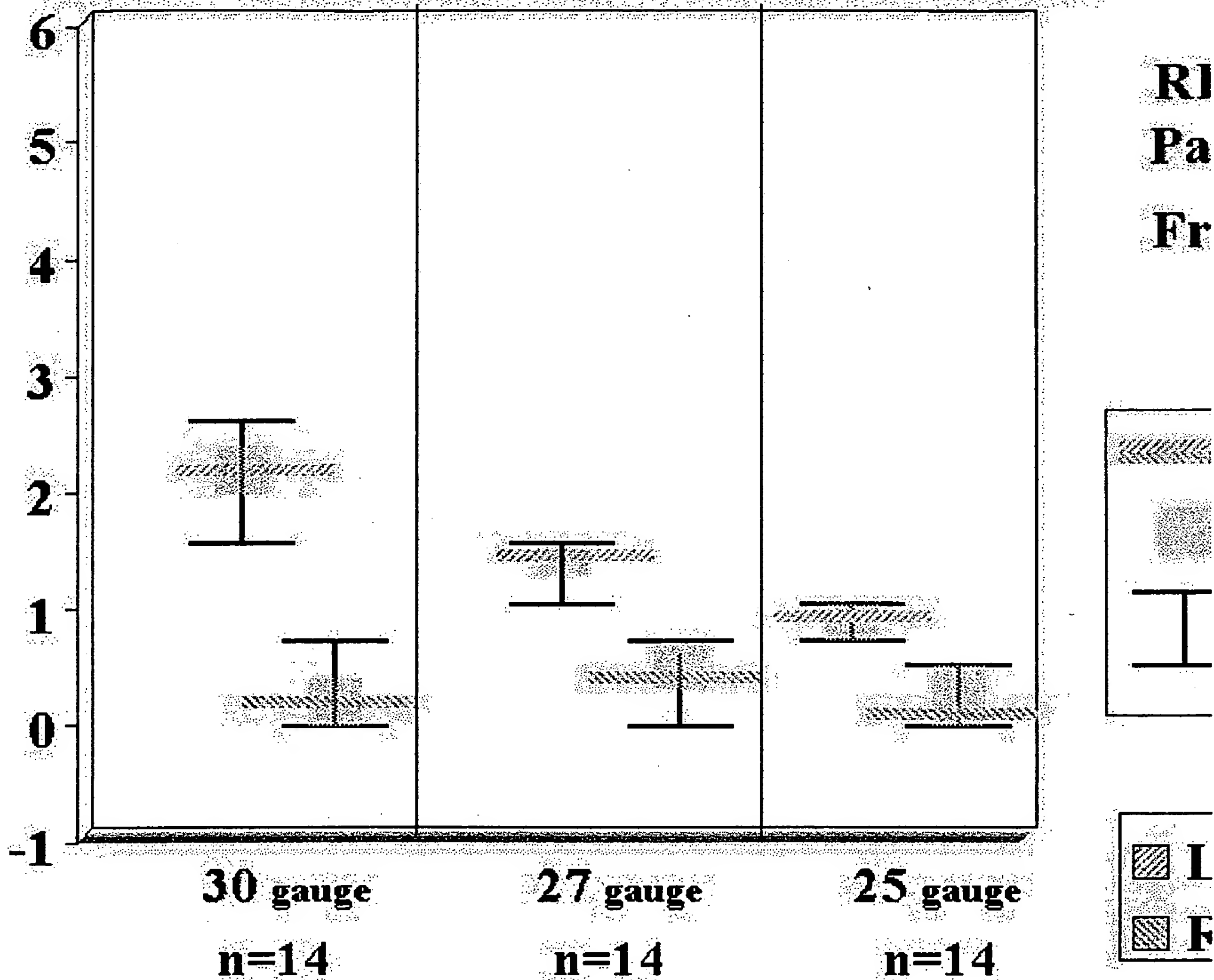


FIG. 4

TEST AVAILABLE C